2023-2282

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

IN RE: THE PEN,

Appellant.

Appeal from the United States Patent and Trademark Office,
Patent Trial and Appeal Board in U.S. Serial No. 16/104,878

BRIEF FOR APPELLEE - DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

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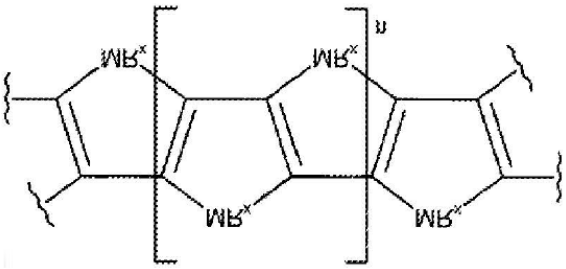
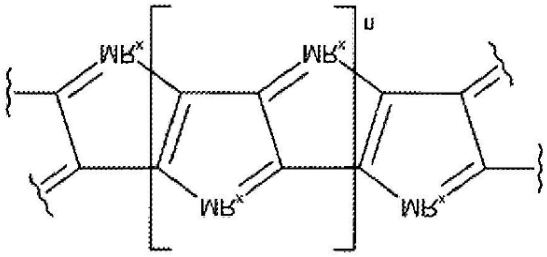
February 27, 2024

Representative claim 1

1. A polycylic metallole heteroatom rich conductive long chain polymer comprised of the repeating unit in the brackets in either formula 2 below, where n is the number of repeating units, M is the heteroatom, R is any substituent, and x is the number of R substituents, depicted as



or formula 4 below, where n is the number of repeating units, M is the heteroatom, R is any substituent, and x is the number of R substituents, depicted as



where there are more than eight repeating units, and where the metallole heteroatom is nitrogen.

Appx3; Appx15-160-161.

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STATEMENT OF RELATED CASES

Pro se Appellant, The Pen (Pen), seeks relief from the final decision of the Patent Trial and Appeal Board (Board) of the U.S. Patent and Trademark Office (USPTO) in U.S. Patent Application Serial No. 16/104,878 (the ’878 application). To the Director’s knowledge, there are no other appeals or pending proceedings concerning the ’878 application that will affect or be directly affected by a decision in this appeal.

I. STATEMENT OF THE ISSUE

Pen seeks reversal of a Board decision holding his claims to metallole polymers unpatentable for lack of enablement. Independent claim 1, which is illustrative of the claims at issue, recites conductive metallole polymers having a polycyclic repeating unit-backbone defined by either of two general chemical formulas. Claim 1 further recites that the polycyclic subunits may include "any substituent" R group(s) and an undefined number of R substituents, "x," without specifying a limit as to the number of R substituents. Still further, claim 1 defines the number of repeating units "n" simply as "more than eight," without an upper limit as to the total number of repeating units. Pen's specification describes its invention in broad strokes without identifying any working examples. The closest prior art, Fukazawa, discloses a conjugated thiophene polymer with 8 repeating units.

The Board agreed with the Examiner that Pen's claims have a very broad scope given their lack of numerical and R group limits. The Board also agreed that the claims' and the specification's relative silence as to the number and chemical structure of the claimed substituent R groups, along with the absence of any working examples, was not sufficient to enable claims of such breadth. The Board further agreed that Pen's claims were not enabled as to the number of repeating units "n" because the closest prior art polymers did not exceed eight subunits.

The only issue on appeal is whether substantial evidence supports the Board's determination that Pen's claims are unpatentable for lack of enablement.

II. STATEMENT OF THE CASE

Pen is the owner and named inventor in the '878 application. The Examiner rejected claims 1, 4-6, 10, and 13 in the '878 application for lack of enablement under 35 U.S.C. § 112(a). (Appx143-146.) The Examiner also rejected claim 5 as being indefinite under 35 U.S.C. § 112(b). (Appx142.) The Board affirmed the Examiner's enablement rejection, but reversed the indefiniteness rejection. (*See* Appx9.) Pen now appeals the Board's enablement determination to this Court.

A. The claimed metallole polymers

The '878 application broadly describes organometal polymers for use in electroconductive nanosheets and nanorods. (Appx41.) The '878 application states that one objective of the claimed organometal polymers is to provide improved conductivity over previously known conductive polymers." *See, e.g.*, Appx54-55. Toward that end, the '878 application discloses that, unlike typical organometallic polymers, which conduct electricity through metal-to-metal bonds, Pen's organometal polymers "behave as metals, but with vastly increased edge boundaries and surface areas, to take full advantage of quantum effects supportive of applications like new super capacitors, battery materials, and very efficient conductors, even superconductors." (Appx42.)

In one embodiment, the organometal polymers are "metallole[1]" polymers. "Metalloles" comprise a group of "derivatives of cyclopentadiene in which the carbon atom at position 5, the saturated carbon, is replaced by a heteroatom[2]." The '878 application describes the claimed metallole polymers as having "new formulations of nitrogen atom rich coordinating polymeric backbones . . . refer[red] to as polycyclo-pyrrole (PCPy) and polycyclo-pyrazine (PCPz)." (Appx43.) According to the '878 application, these embodiments have the benefit of "dual modes of conductivity, by resonance through the main polymer backbone, together with conductivity through the tandem metal chains, using relatively small amounts of actual metal on a total mass ratio basis." (Appx52.)

Importantly, while the '878 application describes methods for producing PCPy backbone molecules (*see* Appx51-52, 54), the application contains no working examples and no citation to the prior art disclosing that these methods successfully produce PCPy or PCPz. Moreover, while the '878 application describes methods for producing metallole polymers with a PCPy backbone (*see* Appx56-63), the application contains no working examples and no citation to a prior art reference suggesting or disclosing that these methods successfully

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[1] *See* Encyclo.Co.UK, at definition of "metallole" (last visited Feb. 22, 2024) https://www.encyclo.co.uk/meaning-of-Metallole.

[2] A Merriam-Webster Dictionary. A "heteroatom" is "an atom other than carbon in the ring of a heterocyclic compound." *See* (last visited Feb. 27, 2024) https://www.merriam-webster.com/dictionary/heteroatom .

produce a metallole polymer(s) containing a PCPy or PCPz backbone. Rather, the '878 application acknowledges that prior art attempts to make similar metallole polymers have produced poorly conductive oligomers having no more than eight repeating units. (Appx54-55 (citing Aiko Fukazawa & Shigehiro Yamaguchi, Ladder π-Conjugated Materials Containing Main-Group Elements, Chem. Asian J., 4:1386-1400 at 1386 (2009) (Fukazawa) (SAppx1-15).)

Independent claim 1 is illustrative of the claims on appeal:

> 1. A polycylic metallole heteroatom rich conductive long chain polymer comprised of the repeating unit in the brackets in either formula 2 below, where n is the number of repeating units, M is the heteroatom, R is any substituent, and x is the number of R substituents, depicted as
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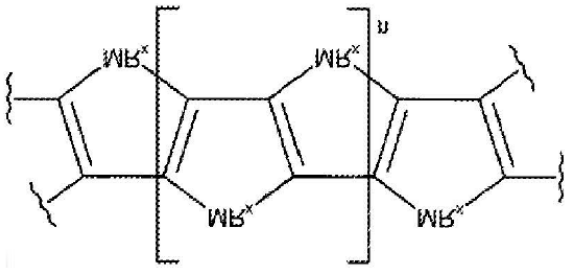
> 
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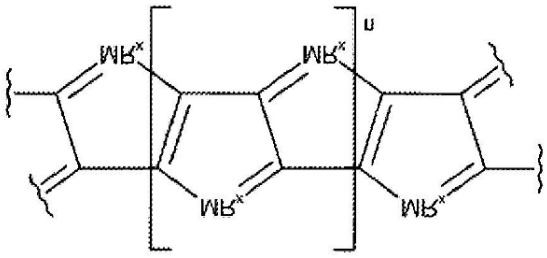
>
> 
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> where there are more than eight repeating units, and where the metallole heteroatom is nitrogen.

(Appx3, Appx160-161.) As shown, claim 1 recites that the number of repeating units "n" is "more than eight repeating units." *Id.* Thus, representative claim 1 contains no upper limit for the number of repeating units, only a lower limit of eight. Importantly, there is no disclosure in the '878 application providing an upper limit to the number of repeating units, including any disclosure of an embodiment with more than eight repeating units.

As also shown, claim 1 recites that the substituent group "R"[3] can be "any substituent." *Id*. Moreover, while claim 1 states that "x" represents the number of R substituents, it provides no upper or lower limit to the number of R substituents. As with the number of repeating units "n," the '878 application places no limitation on the number of R substituents or the type of R substituents, e.g., by chemical group or function.

B. The Examiner's enablement rejection

The Examiner rejected Pen's pending claims under 35 U.S.C. § 112(a) as failing to comply with the enablement requirement, given the broad scope of the

[3] *See* Illustrated Glossary of Organic Chemistry. An "R group" is "[a]n abbreviation for any group in which a carbon or hydrogen atom is attached to the rest of [a] molecule. Sometimes used more loosely, to include other elements such as halogens, oxygen, or nitrogen." (last visited Feb. 27, 2024) https://www.chem.ucla.edu/~harding/IGOC/R/r_group.html#:~:text=R%20group%3A%20An%20abbreviation%20for,halogens%2C%20oxygen%2C%20or%20nitrogen.

claims, limited disclosure in the specification, and the undue experimentation that would be needed by an ordinary skilled artisan to practice the claimed invention. Appx143-147; *see also* Appx180-186. In making its findings, the examiner generally discussed the factors set forth in the Manual of Patent Examination and Procedure ("MPEP") § 2164.01(a), also known as the *Wands* factors, which are relevant to the question of whether a specification would require undue experimentation in order to practice the claimed invention. *Id*.; *see also* *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

First, the Examiner found that claim 1 broadly encompasses a generic conductive polymer having an unspecified number of repeating units "n," wherein the repeating units may comprise an unspecified number "x" of any chemical substituent "R." (Appx143-145, Appx181.)

Next, the Examiner found that Pen's claims were not enabled as to the number of repeating units "n" because the closest prior art metallole oligomers do not contain more than eight repeating units. (Appx143-145 (citing Fukazawa (SAppx4-5 at Schemes 6 and 7); Appx181-182 (same).) In particular, the Examiner found that Fukazawa's conjugated thiophene oligomers are the closest prior art molecules to the claimed metallole polymers. (Appx143-144, Appx181-182.) The Examiner further found that Fukazawa's oligomers contain at most eight conjugated thiophene-based monomers. *Id.* Next, in the absence of contrary

evidence, the Examiner found that ordinary artisans would not have known how to make or successfully use a metallole polymer comprising "conjugated repeating units with the claimed 'repeating number' of 'n' being more than 8, at least 50, and at least 1,000," as recited in Pen's claims 1, 10, and 13, respectively. (Appx181; *see also* Appx160-161, Appx163.)

The Examiner similarly found that Pen's claims were also not enabled as to the type or number "x" of the "R" substituent. Specifically, the Examiner found that "[a] definite material selection including monomer, solvent, catalyst, etc. and synthetic route including mechanism, synthetic parameters (temperature, pressure, etc.) are required to practice the claimed polymer." (Appx144-145; Appx182-183.) The Examiner then compared the exceedingly broad nature of Pen's claims with the lack of direction or working examples in the '878 application, and found that ordinary artisans would not be able to achieve the claimed metalloles without undue experimentation:

> [T]he claimed invention **does not specify the claimed substituents** and **no working examples and synthetic routes** have been shown . . . The specification **does not teach how to make and use at least one embodiment** encompassed by the claims as a whole **without undue experimentation**. The specification [is] not enabling due to the **lack of direction** provided in the application at the time of filing because there was **no indication whether the specific material are processed or how their properties are measured to practice the claimed invention**. A definite material selection is required to practice the claimed composition. . . . Therefore, the

> instant specification is **insufficient, coupled with information known in the art, to inform one of ordinary skill in the art how to make and use the claimed invention without undue experimentation**.

(Appx182-183; *see also* Appx144-145 (emphases added).)

C. The Board's decision

The Board affirmed the Examiner's rejection of Pen's claims for lack of enablement. Appx6-9. The Board agreed with the Examiner that "the full scope of the claims is not enabled because 'R' can be 'any substituent' and because the number of repeating units 'n' is not limited despite the closest prior art teaching polymers with only 8 repeating units." (Appx6 (quoting Appx160-161 at claim 1; citing Appx181-183).) The Board noted that the "Examiner provide[d] a detailed discussion of the *Wands* factors" in making that determination. (Appx6 (citing Appx144-145); *see also Wands*, 858 F.2d at 737.)

The Board examined each of Pen's rebuttal arguments and found them to be unpersuasive. First, the Board was unpersuaded by Pen's assertion that the "any substituent R" and "number of R substituents x" limitations are enabled by Figure 1 of the '878 application, which depicts a metallole monomer where there is no substituent R group, and Figure 2, which depicts a single hydrogen molecule as the R substituent. (*See* Appx7 (citing Appx155-156).) In doing so, the Board expressed its agreement with the Examiner that, even assuming that Pen's

specification enabled these two embodiments, the specification did not enable the full scope of his claims. (Appx8 (citing Appx181-183).)

Second, the Board was unpersuaded by Pen's assertion that metallole polymers having more than eight repeating units 'n' was enabled by the specification's disclosure about polymerization reactions that might be used to construct the claimed polymers. (Appx8 (citing Appx182-183).) In particular, the Board found that, "even assuming that a certain number of repeating units 'n' is enabled, it is unclear how the paragraphs cited by the Appellant show enablement of the full scope of the claims, which have no upper limit to the number of repeating units." (Appx8 (citing Appx194); *see also* Appx156, Appx181-183.) On this record, the Board then found that Pen had not established reversible error in the Examiner's rejection. (Appx9 (citing *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("[I]t has long been the Board's practice to require an applicant to identify the alleged error in the examiner's rejections. . . . ").

III. SUMMARY OF THE ARGUMENT

Substantial evidence supports the Board's finding and ultimate determination that Pen's claims are unpatentable for lack of enablement. Independent claim 1 broadly recites metallole polymers comprising repeating units having substituents R of *any* chemical structure or type, *any* number of R groups "x" from zero on up, and *any* number of repeating units "n" *above eight*. Thus,

claim 1 covers a large class of metallole polymers limited only by their shared polycyclic backbone.

The '878 application, in contrast, provides almost no information about the chemical structure of the substituent R group(s) or the number of substituent R groups "x." Instead, it merely sets forth general chemical reactions for making the claimed repeating units, attaching unidentified R groups to the repeating units, and joining the repeating units together to form a polymer. The application also fails to disclose any working examples demonstrating that these general reactions actually produce the vast array of polymers embraced by claim 1 or that such polymers will be electroconductive, i.e., function as intended. On these facts, the Board reasonably found that claim 1 is not enabled as to the substituent R and number of substituents "x" limitations. The Board also reasonably found that claim 1 is not enabled as to the virtually unlimited number of repeating units "n" limitation given that the closest prior art polymers – i.e., Fukazawa's conjugated thiophene oligomers – have at most eight repeating units. None of Pen's rebuttal arguments, which fail to identify any supporting disclosure for the broad breath of the claims sought, established reversible error in the Board's finding.

First, Pen inaptly relies on the Supreme Court's decision in *Amgen v. Sanofi* to argue that his claims are enabled. *Amgen v. Sanofi,* however, fully comports with the Board's determination here. Like the antibody claims in that case, Pen

claims a broad class of metallole polymers whose structure is limited only by a common core structure, i.e., a polycyclic backbone of more than eight repeating units. Like Amgen's specification, the '878 application also provides no "roadmap" on how to make and use the claimed metallole polymers – which comprise any possible R group – without undue experimentation. If anything, *Amgen v. Sanofi* supports the Board's conclusion that the '878 application does not enable how to make and use the metallole polymers of claim 1.

Second, Pen cannot belatedly establish enablement based on unsupported allegations that the intended function of the claimed metallole polymers, i.e., electroconductivity, is wholly independent of the type of substituent R group, the number of R group's "x," and the number of repeating units "n." Because Pen provides no reliable objective support for these assertions, they are entitled to little weight. Moreover, given that the R group can have *any* chemical structure and number, it seems likely that at least some of the thousands of possible R groups encompassed within claim 1 would adversely affect electroconductivity. The same is true for Pen's unsupported assertions that R group-specific details about synthesizing repeating groups and/or polymerizing the claimed repeating units are unnecessary to make and use the full scope of the claimed metallole polymers.

Third, Pen cannot establish reversible error based on flyspecks in the Examiner's *Wands* factor analysis. For example, there is no precedent suggesting

that the Examiner's occasional use of boilerplate constitutes anything more than harmless error, if that. Pen's allegation that the Examiner misrepresented the record when describing deficiencies in the '878 application similarly falls flat when the Examiner's statements are read in context. In contrast to Pen's assertions, the Examiner did not find that the '878 application provides no information about the chemical reagents and reactions that may be used to synthesize the claimed metallole polymers. Rather, the Examiner simply found that the information in Pen's specification is not sufficiently tailored to enable metallole polymers having *any* substituent R group. Finally, the Examiner's inadvertent inclusion of a single sentence from an unrelated matter, while less than exemplary, does not constitute reversible error.

For all these reasons, the Court should affirm the rejection of claim 1 for lack of enablement. Because Pen failed to separately argue for the enablement of the other claims on appeal, those claims fall with claim 1.

IV. ARGUMENT

A. Standard of review

Pen has the burden of showing that the Board committed reversible error. *In re Watts*, 354 F.3d 1362, 1369 (Fed. Cir. 2004).

"Whether a claim satisfies the enablement requirement is a question of law that may be based on underlying factual findings." *Medytox, Inc. v. Galderma*

S.A., 71 F.4th 990, 996 (Fed. Cir. 2023) (citing *Alcon Rsch. Ltd. v. Barr Lab'ys, Inc.*, 745 F.3d 1180, 1188, 1190 (Fed. Cir. 2014)). This Court reviews the Board's ultimate determination of enablement without deference, and its underlying factual findings for substantial evidence. *See Medytox*, 71 F.4th at 996 (citing *ACCO Brands Corp. v. Fellowes, Inc.*, 813 F.3d 1361, 1365 (Fed. Cir. 2016)).

This Court has defined substantial evidence as that which "'a reasonable mind might accept as adequate to support a conclusion.'" *In re Gartside*, 203 F.3d 1305, 1312 (quoting *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229-30 (1938)). "[W]here two different, inconsistent conclusions may reasonably be drawn from the evidence in record, an agency's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence." *In re Jolley*, 308 F.3d 1317, 1329 (Fed. Cir. 2002).

B. Substantial evidence supports the Board's underlying findings and ultimate conclusion that Pen's claims are not enabled

The Board correctly found that the '878 application, taken together with the teachings in the prior art, fails to enable the claimed metallole polymers. "A patent's specification must describe the invention and 'the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same.'" *Baxalta Inc. v. Genentech, Inc.*, 81 F.4th 1362, 1364(Fed. Cir. 2023) (quoting 35 U.S.C. § 112(a)). As the Supreme Court recently reaffirmed in *Amgen v. Sanofi*,

"'the specification must enable the full scope of the invention as defined by its claims,'" allowing for "'a reasonable amount of experimentation.'" 598 U.S. 594, 610-12 (2023). In other words, "[t]he more one claims, the more one must enable." *Id.*; *see also Baxalta*, 81 F.4th at 1365 ("[T]he specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation.") (cleaned up).

Here, there is no dispute that independent claim 1 recites metallole polymers comprising repeating units having substituents R of any chemical structure or type, any number of R groups "x" from zero on up, and any number of repeating units "n" above a basement of eight. Pen's opening brief makes this unabashedly clear. (*See, e.g.*, Br. at 4 ("[T]he claims expressly state that the 'R' could be 'anything'."), Br. at 12 ("[A]ny polymer is of potentially unlimited length").) Thus, claim 1 covers a massive genus of metallole polymers of nearly any size or chemical composition that includes a polycyclic backbone comprising either of the two chemical formulas recited therein.

In contrast, the '878 application provides almost no information about the chemical structure of the substituent R group(s) or the number of substituent R groups "x." Instead, it merely sets forth general chemical reactions for making the claimed repeating units, attaching unidentified R groups to the repeating units, and joining the repeating units together to form a polymer. (*See, e.g.*, Appx56-63.)

While Figures 1 and 2 disclose a prophetic example wherein there is no substituent R group or a single hydrogen R group, respectively, there are no working examples to show that these reactions will actually produce the vast array of polymers claimed or which of those polymers will be electroconductive, i.e., function as intended. Given the mismatch between the breadth of claim 1 and the lack of disclosure in the '878 application, the Board properly found that claim one is not enabled as to either of the substituent R and number of substituents "x" limitations. (Appx7-8; *see also* Appx144-145, Appx182-183.)

Claim 1 also lacks enablement as to the virtually unlimited number of repeating units "n" limitation. As the Examiner correctly found, it is unlikely that ordinary artisans would be able to make or use the claimed polymers without undue experimentation given that none of the closest prior art polymers[4] – i.e., Fukazawa's conjugated thiophene oligomers – exceed eight repeating units. (*See* Appx143-145 (citing SAppx4-5 at Schemes 6 and 7); Appx181-182 (same).) Pen's only counter argument, before the Board (*see* Appx156) and now (*see* Br. at 8-9, 12-13), is based on dictionary definitions of generic polymers and his

[4] To the extent Pen may argue that Fukazawa's oligomers are not polymers and, thus, cannot be considered the "closest prior art," such an argument is refuted by the definition of oligomer provided in Pen's opening brief. (*See* Br. at 8 ("Definition of [o]ligomer: 'A polymer with only a few repeat units in each polymer molecule, i.e., having a degree of polymerization up to a value of 10-20 units.'").)

unsupported assertions that all chemical polymers – regardless of chemical makeup – can be extended to any length. Such unsupported statements are entitled little weight. *See Icon Health & Fitness, Inc. v. Strava, Inc*., 849 F.3d 1034, 1043 (Fed. Cir. 2017) ("Attorney argument is not evidence")(citation omitted); *see also* MPEP § 2145 ("Attorney argument is not evidence unless it is an admission, in which case, an examiner may use the admission in making a rejection."). Moreover, even assuming that Pen's assertions about making the claimed metallole polymers were true, the '878 application's description of Fukazawa's oligomers as being poorly conductive casts doubt on whether ordinary artisans could use the claimed metallole polymers for their intended function, i.e., as electroconductors, regardless of their size. (*See* Appx54 (citing SAppx4 at Scheme 6) (describing Fukazawa's oligomers as "not conduct[ing] very far, a critical difference if conductivity is the objective").) Thus, there can be little doubt that the full scope of claim 1 is not enabled as to the number of repeating units "n." *See Baxalta*, 81 F.4th at 1364-65.

Once the agency has established a *prima facie* lack of enablement case, the burden of production shifts to the applicant to come forward with argument and/or evidence in support of its claims. *See In re Wright*, 999 F.2d 1557, 1561-62 (Fed. Cir. 1993). As shown below, each of Pen's rebuttal arguments is unsupported by evidence and legally insufficient to overcome a reasonable conclusion that the

claimed metallole polymers are not enabled by the '878 application. Moreover, at bottom, Pen does not affirmatively identify any enabling disclosure to support his broad claims.

1. Contrary to Pen's assertions, the *Amgen v. Sanofi* decision actually supports the rejection of his claims for lack of enablement

Pen mistakenly relies on the Supreme Court's decision in *Amgen v. Sanofi* to support its enablement position. (*See* Br. at 9-10.) If anything, that decision supports a lack of enablement here. The patent claims in *Amgen v. Sanofi* defined a wide class of antibodies capable of binding to particular areas on the PCSK9 protein and preventing it from binding to LDL receptors – a class not including and far exceeding the 26 working examples in Amgen's specification. *Amgen v. Sanofi*, 598 U.S. at 612-13. While Amgen's specification set forth methods for making the claimed antibodies and methods for determining whether individual antibodies perform the claimed function, the Supreme Court found that the specification was little more than a license to make and test antibodies for the recited function:

> **The[] two approaches [in Amgen's specification] amount to little more than two research assignments**. **The first** merely describes step-by-step Amgen's own trial-and-error method for finding functional antibodies—**calling on scientists to create a wide range of candidate antibodies and then screen each** to see which happen to bind to PCSK9 in the right place and block it from binding to LDL receptors. **The second** isn't much different. **It**

> **requires scientists to make substitutions to** the amino acid sequences of **antibodies known to work and then test the resulting antibodies** to see if they do too—an uncertain prospect given the state of the art. **Whether methods like a "roadmap" or "conservative substitution" might suffice to enable other claims in other patents** . . . **they do not here**. They leave a scientist about where Sawyer and Man left Edison: forced to engage in "painstaking experimentation" to see what works. That is not enablement.

Amgen v. Sanofi, 598 U.S. at 614 (emphases added).

Like the class of antibodies claimed in *Amgen v. Sanofi*, Pen broadly claims a class of metallole polymers whose structure is defined only by a common polycyclic backbone of more than eight repeating units. Like Amgen's specification, the '878 application also contains no "roadmap" or "conservative substitution" of R groups that would allow an ordinary artisan to make and use the broad class of metallole polymers recited in claim 1 without undue experimentation. These factual similarities support a conclusion that Pen's claims, like Amgen's claims, are not enabled.

2. Pen cannot establish enablement with unsupported assertions that all of the claimed metallole polymers are enabled regardless of R group, R group number "x," and/or number of repeating units "n"

Pen cannot avoid the fate of the antibodies in *Amgen v. Sanofi* and the HIV vaccines in *Wright* by arguing that, unlike the inventions in those cases, ordinary artisans would not need to test the claimed metallole polymers to see if they are

electroconductive for at least two reasons. First, Pen forfeited this argument by failing to raise it to the Board or the Examiner. *See In re Google Tech. Holdings, LLC*, 980 F.3d 858, 863 (Fed. Cir. 2020) ("Meritorious or not, Google never presented these arguments to the Board" and therefore "forfeited both arguments."); *In re Baxter Int'l, Inc*., 678 F.3d 1357, 1362 (Fed. Cir. 2012) ("Absent exceptional circumstances, we generally do not consider arguments that the applicant failed to present to the Board." (citations omitted)). Second, even if unforfeited, these arguments are inapt.

Pen makes the unsupported argument that "the conductive function of the *final product* is wholly dependent on the common core feature [of] the [claimed metallole polymers]." (Br. at 11-12 (emphasis original).) According to Pen, "[t]here is no scientific way any 'R' group . . . in the [polycyclic backbone] structure could have any possible impact on such conductivity. By definition an 'R' is its own terminus. Even if electrons were to theoretically seek to propagate up through an 'R' group, they could pass no further." (Br. at 11.)

Pen cites no disclosure in the '878 application, expert testimony, learned treatise or the like to support these assertions. *See Icon Health & Fitness*, 849 F.3d at 1043 (holding that unsupported arguments are entitled little weight). Moreover, given that the R group can have any chemical structure and number, it seems likely that at least some of the thousands of possible R groups would adversely affect

electroconductivity. In fact, the '878 application's instruction to "leave aside the influence of metal atoms" when describing the predicted transfer of electricity across the polycyclic backbone of the claimed polymers (*see* Appx49 at ll.7-17), taken together with the known conductivity of metals, at least suggests that the inclusion of metal R groups might adversely affect the transfer of electricity across the polycyclic backbone. The '878 application's teachings about the poor conductivity of short metallole polymers (*see* Appx54 at ll.9-13) similarly cast doubt about the electroconductivity of those claimed metallole polymers having a number repeating units "n" near eight.

Similar reasoning undermines Pen's related argument that the '878 application need not provide R group-specific details about synthesizing repeating groups and/or polymerizing repeating units to make metallole polymers of any number of repeating units "n." (*See* Br. at 16-18.) As with his arguments about conductivity, Pen forfeited his argument about the effect of R groups on polymer length by failing to raise it to the Board. *See Google*, 980 F.3d at 863; *Baxter*, 678 F.3d at 1362. According to Pen's opening brief, "[e]ven assuming there were any 'R' groups attached to the nitrogen atoms [in the polycyclic monomers] they simply don't participate in this stage of the polymerization reaction. They just don't matter. If anything they are an afterthought." (Br. at 16-17.) Once again, Pen cites no disclosure in the '878 application, expert testimony,

learned treatise or the like to support these assertions and, thus, they carry little weight. *See Icon Health & Fitness*, 849 F.3d at 1043.

Finally, Pen's reliance on *Genentech* does not help his cause. (*See* Br. at 20-21 (citing *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361 (Fed. Cir. 1997)).) The claim in *Genentech v. Novo Nordisk* was directed to a method of producing a protein consisting of amino acids 1-118 of the human growth hormone (hGH) protein by (1) creating a recombinant DNA molecule encoding amino acids 1-118 of the hGH protein conjugated to an additional DNA sequence encoding an enzyme cleavage site, (2) expressing the recombinant DNA molecule to produce the encoded protein, and (3) enzymatically cleaving the resultant protein to produce amino acids 1-118 of the hGH protein. *See id.* at 1363. Genentech's specification disclosed no reaction conditions for many of the steps needed to produce the claimed hGH proteins, and no specific material to be cleaved or any reaction conditions under which cleavable fusion expression would work. *Id.* at 1365. In holding Genentech's claims non-enabled, the Court explained that :

> When there is no disclosure of any specific starting material or of any of the conditions under which a process can be carried out, undue experimentation is required; there is a failure to meet the enablement requirement that cannot be rectified by asserting that all the disclosure related to the process is within the skill of the art. **It is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement**.

Genentech v. Novo Nordisk, 108 F.3d at 1366 (emphasis added).

Here, the '878 application discloses an array of general chemical reactions that Pen posits may be used to produce a broad class of electroconductive metallole polymers of any number of repeating units "n." As with electroconductivity, none of these proposed reactions considers the effect any substituent R group or any number of R groups "x" might have on the ability to synthesize organopolymers having eight or more – an infinite? – number of repeating units "n." Pen's specification provides no working examples. And Pen points to no knowledge in the art, expert testimony, learned treatise, etc. that might fill the gap. Accordingly, as in *Amgen v. Sanofi*, *Wright*, and *Genentech*, the '878 application does not enable persons of ordinary skill in the art to make and use the claimed metallole polymers regardless of the type of R group, number of R groups "x" and/or number of repeating units "n."

3. Pen cannot establish reversible error by nitpicking the Examiner's *Wands* factor analysis

Pen's complaints about the Examiner's *Wands* factor analysis – taken individually or as a whole – fail to establish reversible error. For example, Pen's opening brief criticizes the Examiner for using "arbitrary boilerplate." (Br. at 14, 15.) The Director is unaware of any precedent holding or suggesting that an Examiner must provide findings and analysis using original prose. As the Board

correctly found, the Examiner did a thorough *Wands* analysis, applying each of the test's factors to the facts of this case. (*See* Appx6.) That is all the law requires.

Pen's opening brief also asserts that the Examiner's "'level of ordinary skill' in the art" findings "misrepresent" the record by "claiming that the specification is silent on 'monomer, solvent, catalyst.'" (Br. at 18.) While Pen provides no citation for this assertion, Pen presumably refers to the Examiner's finding that "[a] definite material selection including monomer, solvent, catalyst, etc. and synthetic route including mechanism, synthetic parameters (temperature, pressure, etc.) are required to practice the claimed polymer." (Appx144.) Read in context, the Examiner is not stating that the '878 application provides *no information* about the chemical reagents and reactions that may be used to synthesize the claimed metallole polymers, but rather making a finding that the information provided in Pen's specification is *not sufficiently tailored* to enable the full scope of Pen's claims. This reading comports with the Examiner's later finding that, because the claims do not specify the substituent R group, the specification must provide definite details on making and using the full scope of the claims to be enabling. (*See* Appx144-145 (finding that "the claimed invention does not specify the claimed substituent[] [R groups] and no working examples and synthetic routes have been shown," and that "[t]he specification [is] not enabling . . . because there [is] no indication [how] the specific material[s] are processed or how their

properties are measured to practice the claimed invention" given that "definite material selection is required to practice the claimed composition.").)

Finally, Pen's opening brief criticizes the Final Office Action and the Examiner's Answer for including a sentence about the enablement of a polycarbonate melt point limitation. (Br. at 19.) As Pen acknowledges, the inclusion of this sentence was inadvertent and has "nothing to do with [this case]." *Id.* Moreover, while less than exemplary, this type of error typically does not constitute reversible error.

For all these reasons, Pen's arguments fail to establish reversible error in the Board's determination that independent claim 1 is unpatentable for lack of enablement. Because Pen did not separately argue the enablement of the remaining claims on appeal, those claims stand or fall with claim 1.

V. CONCLUSION

This Court should affirm because the Board's determination that Pen's claims are unpatentable for lack of enablement was reasonable, the Board's underlying factual findings are supported by substantial evidence, and Pen's opening brief fails to identify any reversible error therein.

Respectfully submitted,

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February 27, 2024